

Developing Strategies for Marine Climate Change Adaptation Planning: The Case for Alternative Future Scenarios

Desarrollando Estrategias para la Planificación del Cambio de Clima Marina: El Caso para Futuro Panoramas

Développer des Stratégies pour la Planification de l'Adaptation au Climat Marin Changement: Le Cas de Scénarios Alternatifs de l'Avenir

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EXTENDED ABSTRACT

Climate change adaptation planning is a rapidly emerging and evolving science in which the three basics of vulnerability – exposure, sensitivity, and adaptive capacity – are assessed and plans are developed to mitigate their effects on species and ecosystems. By far the most effort has been focused on terrestrial systems with only a few efforts addressing the marine environment (e.g. . the Great Barrier Reef Climate Change Action Plan. One method of adaptation planning for use within Florida's terrestrial environment is the alternative future scenarios approach pioneered by the urban planning department at Massachusetts Institute of Technology. This method builds on a process that was developed during the cold war that constructs plausible future scenarios and develops responses to each of them. The MIT approach incorporates social, economic, political, and climate change variables into a model that develops future landscape configurations and outputs the results in geospatial maps. Habitat and species distributions can be overlaid on these maps to identify critical landscape features for conservation. Expert consultations form the basis of the anticipated changes to the landscape. This approach helps land managers prioritize conservation strategies (e.g. identifying lands for conservation) based on features in a future landscape shaped by varying social, biological and economic factors coupled to a range of plausible climate change impacts. We are now developing a similar process to adapt the alternative future scenarios approach to the marine environment in the Florida Keys under the threats of increasing sea surface temperatures, sea level rise, and ocean acidification. Within the marine model, we will also incorporate management options including spatially-explicit reserves, artificial reefs, etc. However, the marine environment is particularly complex because of the regional and global-scale impacts (e.g., ocean acidification), and because strategies that are available for use in terrestrial systems (e.g. land purchases) are not as easily adaptable to a complex seascape. We feel that this approach will be valuable for marine managers to visualize the effects of climate change on the resources they manage, and to begin the process of developing pro-active management strategies to cope with the pernicious effects of a changing climate on marine species, marine ecosystems, and the human systems they support.

KEY WORDS: Climate change, adaptation